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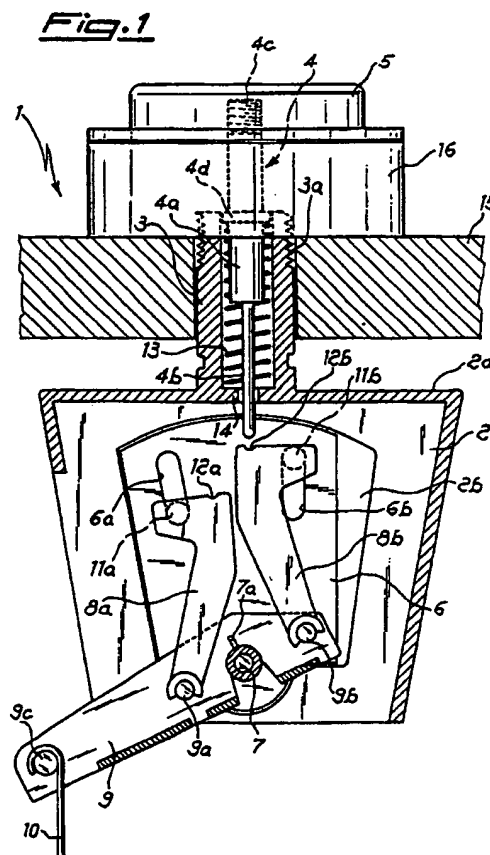
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54 Controlled operation device for discharge valves in sanitary equipment.

57 A controlled operation device for discharge valves, particularly for water storage cisterns in sanitary and similar facilities, comprising a supporting body (2) made integral with a hollow cylinder (3), within which is inserted a slidable rod (4) having a spring (13) located coaxially with it and having its upper end (4c) integral with a push button (5), the body (2) being attachable by means of a threaded collar (3a) to the lid (15) of the cistern and comprising a housing within which are located means which rotate in the transverse direction, these rotating means having located on them means of longitudinally guiding elements transmitting the motion of the rod (4) to means of operating the shut-off valve for the starting and stopping of the discharge, the whole operation of control and transmission of motion being carried out in an axial direction between the actuating push button and the centre of rotation of the said rotating means and of the said operating means, the alternating rotation of the rotating means being produced by the uplift pressure, for opening, and entrainment pressure, for closing, exerted by the water on the shut-off valve.



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CONTROLLED OPERATION DEVICE FOR DISCHARGE VALVES IN SANITARY EQUIPMENT

The present invention relates to a controlled operation device for discharge valves, particularly in water storage cisterns of sanitary equipment.

In the known art there are numerous embodiments of operating systems for automatic discharge of the water contained in the storage cisterns of sanitary equipment, but these operating systems have the disadvantage of not permitting effective controlled interruption of the discharge for the purpose of preventing excessive water consumption when this is not required.

Consequently there arises the technical problem of producing a controllable operating device for valves for the discharge of the water contained in storage cisterns of sanitary facilities, permitting the controlled interruption of the discharge and comprising a limited number of parts, not requiring maintenance, having small dimensions, and having a simple and universal system of fitting even in storage cisterns which are already installed.

This objective is achieved by the present invention, which consists of a controlled operation device for discharge valves, particularly for water storage cisterns in sanitary and similar equipment, comprising a controlled operation device for discharge valves, particularly for water storage cisterns in sanitary and similar equipment, comprising a supporting body which is made integral with a hollow cylinder within which is inserted a slidable rod having a spring located coaxially with it and having its upper end integral with a push button; the body is attachable by means of a threaded collar to the lid of the cistern and comprises a housing within which are located transversely rotating means, these rotating means having located on them means of longitudinally guiding elements for transmitting the motion of the rod to means of actuating the shut-off valve for the starting and stopping of the discharge, the whole operation of control and transmission of motion being carried out in an axial direction between the actuating push button and the centre of rotation of the said rotating means and of the said actuating means, the alternating rotation of the rotating means being produced by the uplift pressure, for opening, and entrainment pressure, for closing, exerted by the water on the shut-off valve.

In the controlled operation device according to the invention, the slidable rod has a central body of circular section and a lower end part which is also of circular section but of smaller diameter, the rotating means and guiding means preferably consisting of a flat plate, with an appropriate profile and longitudinally slotted holes formed in this plate respectively.

It is also specified that the means of transmitting the motion from the rod to the means of operating the shut-off valve should preferably consist of two arms whose upper parts are constrained to slide within the guide slots by means of pins or similar elements and whose lower parts are hinged to the means of operating the valve, seats for engagement with the free end of the rod being present on the upper surface of the arms; the means of operating the shut-off valve consist of a lever hinged on the pivot forming the centre of rotation of the rotating means with which it rotates as one piece by means of a key or similar in order to produce, under the effect of the uplift in opening or of the head of water in closing, the return of the means from one or other side of the vertical axis of symmetry of the device

Further details may be found in the following description, with reference to the attached drawings, which show:

In Fig. 1, a partially sectional front view of the operating device according to the invention in the rest state;

In Fig. 2, a partially sectional view of the device shown in Fig. 1, in the discharging state;

In Fig. 3, a partial section of the operating device according to the invention in the discharging state;

In Fig. 4, a section along the plane IV-IV in Fig. 3.

The controlled operation device indicated as a whole by 1 comprises a supporting body 2 whose horizontal upper edge 2a is connected to a hollow cylinder 3 having its upper end provided with a thread 3a.

Within the hollow cylinder there is inserted a rod 4 having a central body 4a of circular section and a lower end part 4b also of circular section but of smaller diameter; the rod 4 also has an upper end 4c threaded for engagement with a push button 5 for operation of the discharge and a collar 4d retaining the upper end of a spring 13 located coaxially with the rod 4, the other end of the spring being prevented from emerging by the rim of a through hole 14 in the lower end 4b of the rod 4.

In the lower part of the supporting body 2 a housing 2b is formed for the location of a plate 6 rotating about a pivot 7 which is integral with the body 2, the plate being provided with two longitudinal guide slots 6a and 6b arranged symmetrically about the vertical axis of symmetry of the device.

The mechanism is completed by two arms 8a and 8b hinged at their lower ends to two pivots 9a and 9b of a lever 9 which in turn is hinged to the pivot 7 and made integral with the plate 6 by

means of a key 7a, and with a hook 10 for connection to the shut-off valve, which is not illustrated, by means of another end pivot 9c. The upper ends of the arms have pins 11a and 11b constrained to slide in the guides 6a and 6b and upper surfaces having notches 12a and 12b to facilitate the engagement of the arms with the free lower end of the rod 4.

The device 1 is made integral with the lid 15 of the water storage cistern by means of a collar 16 screwed on to the thread 3a of the hollow cylinder 3, the actuating push button 5 screwed to the rod 4 being slidable within the collar.

In the rest position, the device according to the invention has its push button 5 and rod 4 raised the spring 13 extended, the arm 12b raised and the arm 12a lowered, the rotating plate 2 rotated to the left, and lever 9 lowered and held in position by the pressure exerted on the shut-off valve by the volume of water contained in the cistern.

When the user wishes to operate the water discharge, he presses the button 5 thus causing the descent of the rod 4, the compression of the spring 13 which is pushed by the collar 4d, and the engagement of the free end 4b with the notch 12b of the arm 8b, which in turn is pushed downwards in an axial direction determined by the constraint formed by the slot 6b for a distance less than the working length of the slot.

The downward travel of the arm 8b applies, through the pivot 9b, a corresponding force to the lever 9, causing it to rotate and lift the end pivot 9c which raises with it both the valve operating hook 10 and the arm 8a (Fig. 2): at this point the push button 5 is released and, by the reaction of the spring 13, the push button 5 and the rod 4 return to the rest position, disengaging the arm 8b which is subjected, through the lever 9, to a further action due to the uplift of the valve which causes a further axial rectilinear displacement of the two arms 8a and 8b, in the upward and downward directions respectively, until the two pivots 11a and 11b reach the end of their travel in slots 6a and 6b respectively.

This results in the rotation of the body 6 which moves to the other side of the axis of symmetry, bringing the notch 12a of the raised arm 8a into alignment with the end 4b of the rod 4, and thus preparing the device (Fig. 3) for any subsequent pressure on the button 5 by the user; this action, by repeating the sequence of movements in the reverse order, causes the controlled shut-off of the discharge and a return to the initial configuration.

More particularly, it should be noted that the final part of the displacement up to the end of the downward travel of pivot 11a and the upward travel of pivot 11b is determined in this case by the return action of the water which renews its pressure

on the discharge shut-off valve.

It will be appreciated that many modifications may be made to the embodiment of the individual parts without thereby departing from the scope of protection of the present invention.

Claims

1) A controlled operation device for discharge valves, particularly for water storage cisterns in sanitary and similar equipment, comprising a supporting body which is made integral with a hollow cylinder within which is inserted a slidable rod having a spring located coaxially with it and having its upper end integral with a push button, the body being attachable by means of a threaded collar to the lid of the cistern, characterized in that the supporting body comprises a housing within which are located transversely rotating means, these rotating means having located on them means of longitudinally guiding elements for transmitting the motion from the rod to means of operating the shut-off valve for the starting and stopping of the discharge, the whole operation of control and transmission of motion being carried out in an axial direction between the actuating push button and the centre of rotation of the said rotating means and of the said operating means, the alternating rotation of the rotating means being produced by the uplift pressure, for opening, and entrainment pressure, for closing, exerted by the water on the shut-off valve.

2) A controlled operation device for discharge valves, particularly for water storage cisterns in sanitary and similar equipment, according to Claim 1, characterized in that the slidable rod has a central body of circular section and a lower end part which is also of circular section but of smaller diameter.

3) A controlled operation device for discharge valves, particularly for water storage cisterns in sanitary and similar equipment, according to Claim 1, characterized in that the rotating means and guiding means should preferably consist of a flat plate with an appropriate profile and longitudinally slotted holes formed in this plate respectively.

4) A controlled operation device for discharge valves, particularly for water storage cisterns in sanitary and similar equipment, according to Claim 1, characterized in that the means of transmitting the motion from the rod to the means of operating the shut-off valve should preferably consist of two arms whose upper parts are constrained to slide within the guide slots by pins or similar elements and whose lower parts are hinged to the means of operating the valve, seats for engagement with the free end of the rod being present on the upper

surface of the arms.

5) A controlled operation device for discharge valves, particularly for water storage cisterns in sanitary and similar equipment, according to Claim 1, characterized in that the means of operating the shut-off valve consist of a lever hinged on the pivot forming the centre of rotation of the rotating means with which it is made to rotate as one piece by a key or similar in order to produce, under the effect of the uplift in opening or of the head of water in closing, the return of the means from one or other side of the vertical axis of symmetry of the device.

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Fig. 1

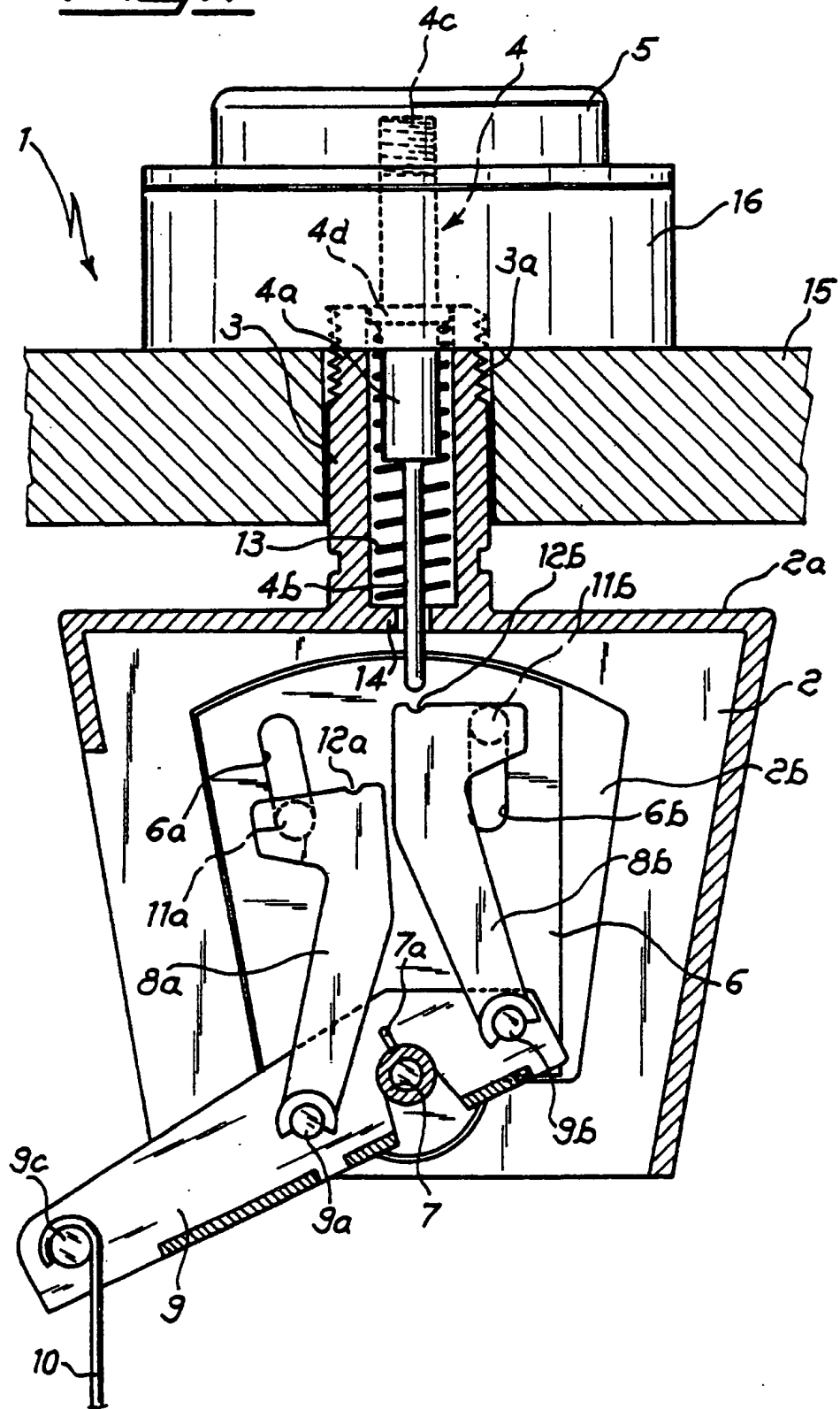


Fig. 2

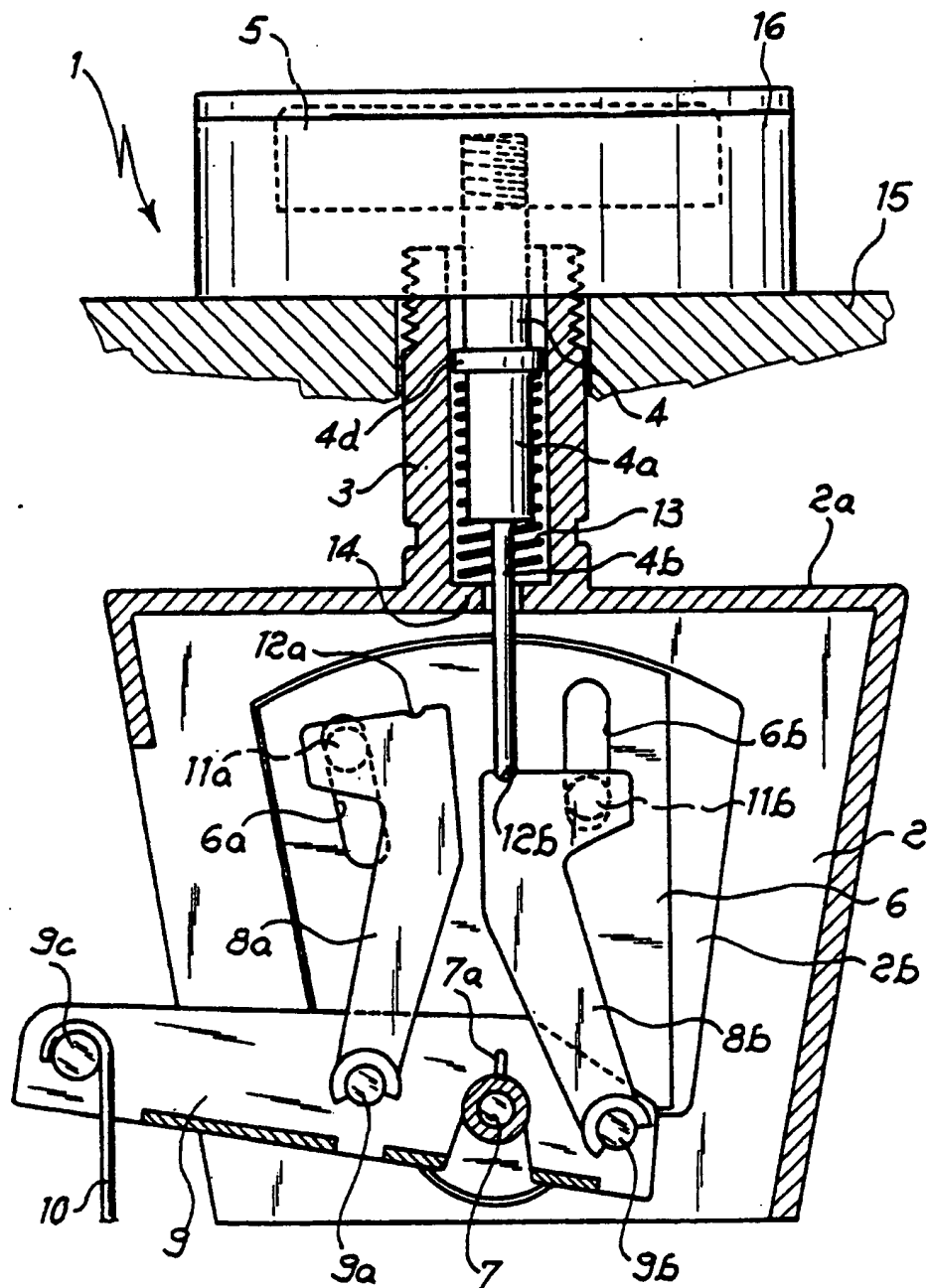


Fig. 3

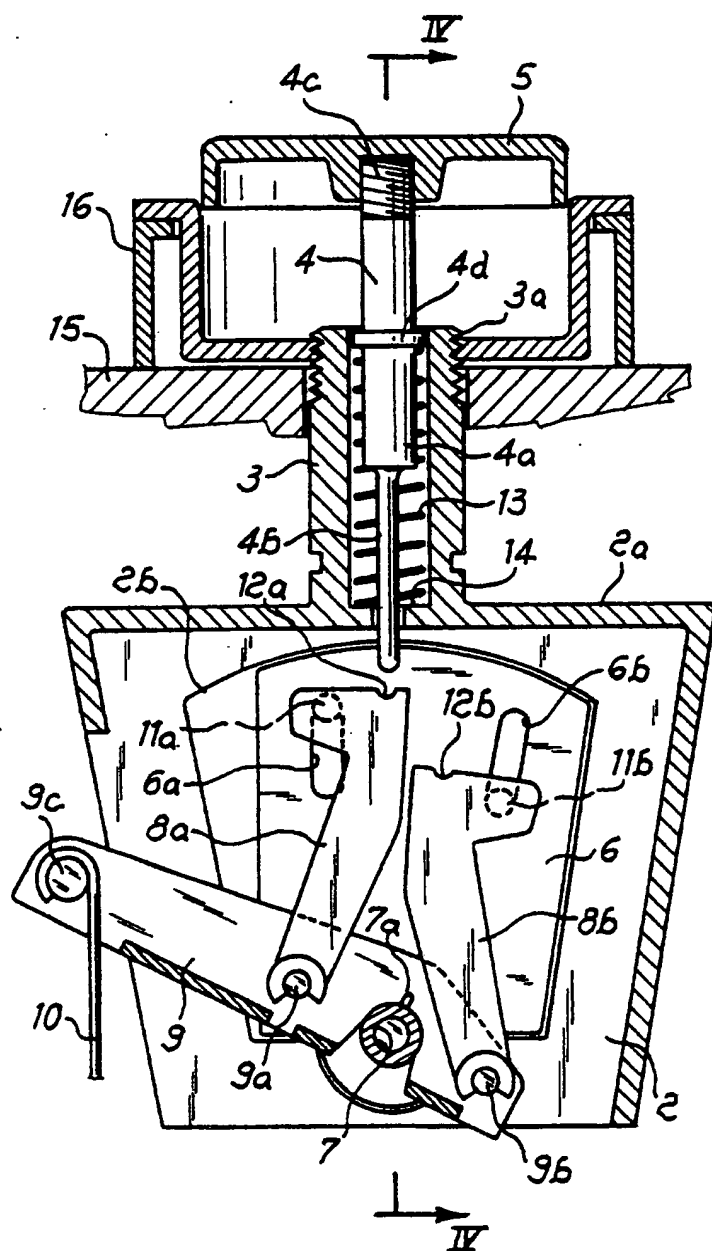
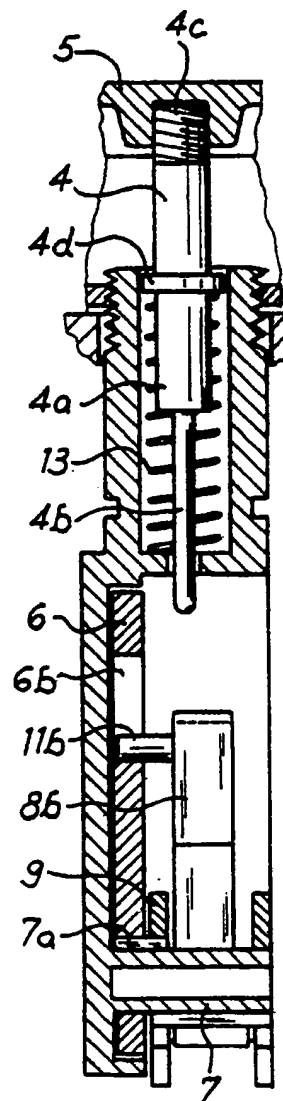


Fig. 4





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EUROPEAN SEARCH REPORT

Application Number

EP 90 20 2742

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int. Cl.5)
Y,A	FR-A-2 548 328 (GEBERIT) * page 1, lines 1 - 33 * * page 2, lines 15 - 27; figures 1-3 * - - - -	1,2,5,3	E 03 D 1/14 G 05 G 7/08
Y,A	DE-C-1 649 20 (ROTH) * page 1, lines 1 - 51; figure 1 * - - - -	1,2,5,3,4	
A	US-A-2 777 329 (BANKER) * column 1, lines 15 - 21 * * column 1, lines 49 - 59 @ column 2, line 47 - column 3, line 60 @ column 4, line 18 -column 5, line 23 * * column 5, lines 33 - 42; figures 1, 5-6 * - - - - -	1-5	
			TECHNICAL FIELDS SEARCHED (Int. Cl.5)
			G 05 G E 03 D
The present search report has been drawn up for all claims			
Place of search		Date of completion of search	Examiner
The Hague		06 February 91	GUILLAUME G.E.P.
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